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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/748,305

12/30/2003

Stefan Bader

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EXAMINER

KACKAR, RAM N

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

12/28/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/748,305

Applicant(s)

BADER ET AL.

Examiner

Ram N. Kackar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-27 is/are pending in the application.
- 4a) Of the above claim(s) 4-13 and 20-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 14-19 and 23-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 10/31/07.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/31/2007 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-2, 14-19, 23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lie et al (US 6494955) in view of Harris et al (US 3436255).**

Lie et al disclose a substrate and a substrate support assembly in a CVD chamber (Fig 1) with gas inlet and exhaust and show a temperature-controlling surface having distinct circumferential steps (Fig 2A- 208, 226, 224 and 222) to provide variable gap for controlling heat conductivity (Col 3 line 54- Col 4 line35). The number of steps as can be seen is four, including the step in contact with the substrate.

Regarding the limitation of substrate height, it is noted that the projection of substrate depends upon its thickness. Further, it was held in re Gardner v. TEC Systems, Inc., 725 F.2d

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1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984) that where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

In this case principle of operation in Lie et al is same as in the claimed invention.

Nevertheless, Harris et al disclose a substrate disposed on a recess in a heater in an epitaxial CVD apparatus and disclose it to be above the recess as in Fig 2, midway (as claimed) in Fig 4 and 7 and flush mounted as in Fig 8 and 10. Harris et al teach that upper surface of the wafer should be above the surface of the heater or at least coplanar and the efficiency is deposition is materially reduced if the surface is even slightly beneath the surface of the heater (Col 4 line 68 to Col 5 line 12). From this teaching it is clear that the recess should better be designed so that substrates either project up or at least be coplanar. As long as they are not below the heater surface (*gas flow is not impeded*) it is equivalent if they are coplanar or projecting up.

Therefore disposing substrates so that they project a bit up would be obvious to one of ordinary skill in the art at the time of invention.

4. Claims 1-2, 14-19, 23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gurary et al (US 6001183) in view of Harris et al (US 3436255).

Gurary et al disclose a substrate holder which could be used in an epitaxial deposition having three dimensional structures for control of temperature at the surface of the susceptor by providing controlled thermal conductivity at different regions (Abstract, Fig 1-Fig 16). The

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stepped relief structure is disposed centrally especially at (Fig 16-113). The different structures could have smooth curved transition or stepped transition (Col 13 line 58- 62). The substrate could be mounted in a recess or on step in recess. The substrate could be edge supported as in Fig 16. The epitaxial deposition system as inherent and as disclosed used gases and discloses exhaust.

Regarding the number of steps, since steps could substitute a curved surface, it would be obvious to have steps to provide uniformity of temperature. Further it is easy to see that large number of steps with smaller dimensions approximates a curve. So it would be obvious to have more than four steps to provide better resolution of temperature control.

As discussed above regarding the limitation of substrate height, it is noted that the projection of substrate depends upon its thickness. Further, it was held in *re Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984) that where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

In this case principle of operation in Gurary et al is same as in the claimed invention.

Further as above, Harris et al disclose a substrate disposed on a recess in a heater in an epitaxial CVD apparatus and disclose it to be above the recess as in Fig 2, midway (as claimed) in Fig 4 and 7 and flush mounted as in Fig 8 and 10. Harris et al teach that upper surface of the wafer should be above the surface of the heater or at least coplanar and the efficiency is deposition is materially reduced if the surface is even slightly beneath the surface of the heater

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(Col 4 line 68 to Col 5 line 12). From this teaching it is clear that the recess should better be designed so that substrates either project up or at least be coplanar. As long as they are not below the heater surface (*gas flow is not impeded*) it is equivalent if they are coplanar or projecting up.

Therefore disposing substrates so that they project a bit up would be obvious to one of ordinary skill in the art at the time of invention.

5. Claims 1-2, 14-19, 23 and 26 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Gurary et al (US 6001183) in view of Lie et al (US 6494955) and further in view of Harris et al (US 3436255).

Gurary et al disclose a substrate holder which could be used in an epitaxial deposition having three dimensional structures for control of temperature at the surface of the susceptor by providing controlled thermal conductivity at different regions (Abstract, Fig 1-Fig 16). The different structures could have smooth curved transition or stepped transition (Col 13 line 58-62). The substrate could be mounted in a recess or on step in recess.

Gurary et al suggest stepped surface in place of a continuous curved surface as equivalent. As explained below Lie et al show stepped surface more explicitly. Lie et al show a temperature-controlling surface having distinct steps (Fig 2A) to provide variable gap for controlling heat conductivity (Col 3 line 54- Col 4 line 35). The number of steps as can be seen is four, including the step in contact with the substrate.

Therefore having steps for gap control for controlling thermal conductivity for temperature profile control would have been obvious for one of ordinary skill in the art at the time of invention.

Regarding the disposition of substrate, Harris et al disclose a substrate disposed on a recess in a heater in an epitaxial CVD apparatus and disclose it to be above the recess as in Fig 2, midway (as claimed) in Fig 4 and 7 and flush mounted as in Fig 8 and 10. Harris et al teach that upper surface of the wafer should be above the surface of the heater or at least coplanar and the efficiency of deposition is materially reduced if the surface is even slightly beneath the surface of the heater (Col 4 line 68 to Col 5 line 12). From this teaching it is clear that the recess should better be designed so that substrates either project up or at least be coplanar. As long as they are not below the heater surface (*gas flow is not impeded*) it is equivalent if they are coplanar or projecting up.

Therefore disposing substrates so that they project a bit up would be obvious to one of ordinary skill in the art at the time of invention.

6. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gurary et al (US 6001183) or Lie et al (US 6494955) in view of Harris et al (US 3436255) as applied to claims 1-2, 14-19, 23 and 26 and further in view of Satoh (US 6063203).

Gurary et al or Lie et al in view of Harris et al do not disclose surface roughness of the substrate holder.

However surface roughness of substrate holders are kept low for different reasons.

Satoh teaches that lower surface roughness from 2-8 μ m helps in reducing frictional wear (Col 6 lines 45-55).

Therefore having surface roughness below 10 μ m would have been obvious for one of ordinary skill in the art at the time of invention.

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7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gurary et al (US 6001183) or Lie et al (US 6494955) in view of Harris et al (US 3436255) as applied to claims 1-2, 14-19, 23 and 26 and further in view of Goodman et al (US 6454865).

Gurary et al or Lie et al in view of Harris et al do not disclose the substrate holder made of solid silicon carbide material.

Goodman et al teach that Silicon carbide is a material of choice for susceptors in CVD applications (Col 7 lines 56-66) for its strength, thermal properties and resistance to high temperature.

Therefore having a material of SiC for susceptor of Gurary or Lie et al would have been obvious to one of ordinary skill in the art at the time of invention.

Response to Arguments

Applicant's arguments filed 10/31/2007 have been fully considered but they are not persuasive and moot in view of the present grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ram Kackar

Primary Examiner AU 1763